

Notice of Allowability

Application No.

09/931,113

Examiner

Nikolas J. Uhler

Applicant(s)

HIRAMOTO ET AL.

Art Unit

1773

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 2/12/2004.
2. ☒ The allowed claim(s) is/are 1-7, 9-21, 24-33, 35, 37 and 39-68.
3. ☒ The drawings filed on 16 August 2001 are accepted by the Examiner.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some* c) ☐ None of the:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

- | | |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892) | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 6. <input checked="" type="checkbox"/> Interview Summary (PTO-413),
Paper No./Mail Date <u>03222004</u> . |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit
of Biological Material | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance |
| | 9. <input type="checkbox"/> Other _____ |

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it **MUST** be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Deakin Lauer on 03/19/2004.

The application has been amended as follows:

- **The STATUS of claims 3-4, 20, and 29-44** has been changed from "(withdrawn)" to -- (currently amended) --
- **Claim 3: Lines 3-4:** "(with m being an integer of 1 or greater)" has been deleted and -- , where m is an integer of 1 or greater, -- has been inserted between "intermediate layer," in line 3 and "Mm is an" in line 3
- **Claim 5: Lines 3-4:** "(with m being an integer of 1 or greater)" has been deleted and -- , where m is an integer of 1 or greater, -- has been inserted between "intermediate layer," in line 3 and "Mm" in line 4
- **Claim 11: Line 5:** "(with n = 1, 2, 3)" has been deleted and -- with being equal to 1, 2, or 3, -- has been inserted therefor
- **Claim 13: Lines 2-3:** "(with n being an integer of 1 or greater)" has been deleted from line 3, and -- , with n being an integer of 1 or greater, -- has been inserted between "2n magnetic layers" in line 2 and " and 2n-1 non-magnetic" in line 3

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- **Claim 14: Line 7:** "(with n being 1 or 2)" has been deleted, and -- , with n being 1 or 2, -- has been inserted between "is d_n ," and "and its average" in line 8
- **Claim 15: Lines 2-3:** "(with n being an integer of 1 or greater)" has been deleted and -- , with n being an integer of 1 or greater, -- has been inserted between " $2n+1$ magnetic layers" in line 2 and "and $2n$ non-magnetic" in line 3
- **Claim 16: Line 8:** "(d_n , with n being 1, 2, or 3)," has been deleted, and -- d_n , with n being 1, 2, or 3, -- has been inserted therefore
- **Claim 20: line 3:** "(with m being an integer of 1 or greater)" has been deleted and -- , where m is an integer of 1 or greater, -- has been inserted between "intermediate layer," and " M_m "
- **Claim 24: line 2:** -- Cu and -- has been inserted between "selected from" and "the elements of groups"
- **Claim 24: line 2-3:** "(but excluding Fe, Co, and Ni) and Cu." has been deleted from lines 2-3 and -- but excluding Fe, Co, and Ni. -- has been inserted therefor.
- **Claim 27, lines 2-3:** "(wherein Me is at least one selected from the group consisting of Re, Ru, and Rh, and $0.1 \leq X \leq 20$)" has been deleted and -- , wherein Me is at least one selected from the group consisting of Re, Ru, and Rh, and $0.1 \leq X \leq 20$. -- has been inserted therefor
- **Claim 28: Lines 2-3:** "(wherein Me is at least one selected from the group consisting of Pd, and Pt, and $40 \leq X \leq 55$).)" has been deleted and -- wherein Me is at least one selected from the group consisting of Pd, and Pt, and $40 \leq X \leq 55$. -- has been inserted therefor

Rejoinder of Claims

2. Claims 1-7, 9-21, 24-33, 35, 37, 29-52, and 59-68 directed to an allowable product. Pursuant to the procedures set forth in the Official Gazette notice dated March 26, 1996 (1184 O.G. 86), claims 53-58, directed to a product or a process of making or using the patentable product, previously withdrawn from consideration as a result of a restriction requirement, are now subject to being rejoined. Claims 53-58 are hereby rejoined and fully examined for patentability under 37 CFR 1.104.

Since all claims previously withdrawn from consideration under 37 CFR 1.142 have been rejoined, the restriction requirement made in the office action dated 7/15/2003 is hereby withdrawn.

Reasons for Allowance

3. The following is an examiner's statement of reasons for allowance: The closest prior art to that of the instant invention includes: U.S. patents #6275363, 6271997 and 6407890 to Gill et al., U.S. patent #6639764 to Saito et al., and The Journal of Magnetism and Magnetic Materials 210 (2000) L20-24 to Sakakima et al. All of these references teach magneto-resistive elements utilizing either free or pinned layers that are formed of multiple thin magnetic films, wherein a spacer layer separates each thin magnetic film. However, there is no teaching or suggestion in the prior art to utilize a non-magnetic layer between adjacent magnetic layers in a free or pinned magnetic layer structure, wherein the non-magnetic layer is a multilayer film including at least one layer of non-magnetic metal and at least one layer of non-magnetic material selected from oxides, nitrides, carbides, and borides.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nikolas J. Uhler whose telephone number is 571-272-1517. The examiner can normally be reached on Mon-Fri 7:30 am - 5 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul J. Thibodeau can be reached on 571-272-1516. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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